

WHAT IS CLAIMED IS:

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1. A system for proportioning foam concentrate into variably flowing fire fighting fluid passing through a conduit, comprising:

5 a conduit for fire fighting fluid having a variable orifice therein, the variable orifice defined at least in part by a first adjusting element, the element in communication with and structured to adjust at least in part in accordance with pressure differential of fluid in the conduit;

10 a foam concentrate passageway having a variable concentrate orifice, the concentrate passageway in fluid communication with fluid passing through the conduit, the variable concentrate orifice at least in part defined by a second adjusting element;

15 the first and second adjusting elements connected so as to adjust in concert and such that fluid pressure differential acting to adjust the first element enlarges both orifices at a pre-calibrated rates.

2. The apparatus of claim 1 wherein the first adjusting element includes a baffle in the conduit.

20 3. The apparatus of claim 2 wherein the second adjusting element includes a baffle stem in the conduit, the stem connected to the baffle.

4. The apparatus of claim 1 wherein the first adjusting element is structured to adjust the fire fighting fluid orifice to maintain a preselected pressure drop across the orifice.

25 5. The apparatus of claim 4 wherein the foam concentrate passageway is structured to discharge foam concentrate into the fire fighting fluid proximate the pressure drop.

6. The apparatus of claim 1 wherein the fire fighting fluid conduit includes an inner conduit and the foaming concentrate orifice includes a variable slot in fluid communication with the inner conduit.

5 7. The apparatus of claim 6 wherein the inner conduit is structured and located such that a portion of fire fighting fluid passes through the inner conduit.

8. The apparatus in claim 1 wherein the foaming concentrate passageway is in fluid communication with a source of foaming concentrate.

10 9. The apparatus of claim 8 wherein the source of foaming concentrate is pressurized over atmospheric.

10 10. The apparatus of claim 8 wherein the source of foaming concentrate is at ambient pressure.

11. The apparatus of claim 1 wherein the fire fighting fluid variable orifice comprises a nozzle orifice.

20 Sub 12. A method for proportioning foaming concentrate into variably flowing fire fighting fluid passing through a conduit, comprising:

adjusting a fire fighting fluid orifice in a fire fighting fluid conduit to maintain a predetermined pressure drop across the orifice as fluid flow rate through the conduit varies;

25 varying a foam concentrate orifice in concert with the adjustment of the fire fighting fluid orifice; and

supplying foam concentrate through the concentrate orifice into the fire fighting fluid proximate a pressure drop such that a ratio of foaming concentrate proportioned into the fire fighting fluid flowing through the conduit remains approximately constant.

Sub 1  
13. The method of claim 12 wherein the predetermined pressure drop varies by less than 100% over designed effective fire fighting fluid flow rates through the conduit.

Sub 2  
5 14. A method for automatically proportioning foam into variably flowing fire fighting fluid, comprising:

varying a fire fighting fluid orifice in a conduit, thereby creating a pressure drop in the conduit and wherein the varying fire fighting fluid orifice acts as a fire fighting fluid flow rate indicator;

10 varying a foam concentrate orifice, at a rate calibrated in concert with variations of the fire fighting fluid orifice; and

discharging foam concentrate through the variable foam concentrate orifice proximate a low pressure zone created by a pressure drop.

15 15. The method of claim 14 that includes varying the fire fighting fluid orifice based upon a spring resisting fire fighting fluid pressure in the conduit.

2. 16. The method of claim 14 wherein varying the fire fighting fluid orifice includes setting a pilot valve to maintain one or more pre-selected pressure drops across the orifice.

20 1. 17. The method of claim 16 wherein the pilot valve is biased by spring.

Sub 2  
18. The method of claim 14 wherein varying a fire fighting fluid orifice includes adjusting the lateral movement of a baffle/piston within the conduit.

25 Sub 1  
19. Apparatus, comprising:  
an automatic pressure regulating self-ducting foam/fog nozzle including an automatically varying foam proportioning orifice.

20. A method comprising:

automatically adjusting a fire fighting nozzle to control discharge pressure;  
self-educing foam concentrate into the nozzle using a portion of a fire fighting fluid  
flowing through the nozzle; and

5 automatically varying a foam proportioning orifice in order to meter foam concentrate  
self-educted into the nozzle in accordance with fire fighting fluid flow rate through the nozzle.

21. Proportioning apparatus for fire fighting systems, comprising:

a housing having an adjustable water passageway adapted to be connected to a source  
of pressurized water and creating a pressure drop;

10 an adjustable foam concentrate passageway adapted to be connected to a source of  
foam concentrate and communicating with water from the passageway proximate a pressure  
drop;

the foam passageway connected to the water passageway to adjust in concert; and

15 a pilot valve in fluid communication with water pressure upstream and downstream of  
the adjustable water passageway, the valve adapted to influence the adjustment of the water  
passageway toward maintaining pre-selected pressure drop.

22. The apparatus of claim 21 wherein the adjustable water passageway includes  
a dual acting baffle piston, the baffle piston having a first side in fluid communication with  
20 upstream water pressure and the baffle piston having a second side in fluid communication  
through a pilot valve with, alternately, upstream water pressure and downstream water  
pressure.

23. The apparatus of claim 22 wherein the dual action baffle piston is structured to  
present unequal surface areas to pressure in opposing directions.

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